

REMARKS

In view of the above amendments and the following remarks, Applicant requests favorable reconsideration of the above-identified application.

Claims 1-24 remain pending in this application, with Claims 1, 5, 9, 12, 15, 18 and 24 being independent. By this Amendment, Applicant has amended each of the independent claims.

Claims 1-24 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,696,373 (Fukui, et al.) in view of U.S. Patent No. 5,537,210 (Kaneda, et al.). Applicant traverses this rejection.

Each of the independent claims is directed to a grating interference encoder. Among other various features, the invention as recited in each independent claim includes an illuminating optical system, a scale and an annular grating. The scale has a diffraction grating for generating two diffractive light beams having different orders by being irradiated by a coherent light beam from the illuminating optical system. The scale is movable relative to the illuminating optical system. The annular grating deflects the two diffractive light beams having the different orders so as to be reprojected onto the diffraction grating.

Thus configured, the two diffractive light beams formed by irradiating a coherent light beam onto the diffraction grating are diffraction-reflected back onto the diffraction grating of the scale by the annular grating.

The Fukui, et al. patent is directed to an optical encoder with a dual diffraction grating. In the system described in that patent, however, a gap between the scale unit and the head unit is not adjustable. Furthermore, that document does not describe using an annular grating.

The Kaneda, et al. patent is directed to a rotation detecting apparatus and scale. This patent does describe the a system using an annular grating. In the system

described, in that patent, however, the annular grating is merely provided on a scale. In the present invention, the diffraction grating is provided on a scale and an annular grating is used for diffraction-reflecting the diffractive light beams from the diffraction grating back onto the diffraction grating. The Kaneda, et al. patent fails to disclose or suggest such features.

Accordingly, Applicant submits that the Fukui, et al. and Kaneda, et al. patents, taken alone or in combination, fail to disclose or suggest at least the features of a scale with a diffraction grating for generating two diffracted light beams having different orders by being irradiated by a coherent light beam from an illuminating optical system, the scale being movable relative to the illuminating optical system, and an annular grating for deflecting the two diffractive light beams to cause the diffractive light beams to be reprojected onto the diffraction grating, as recited in each of the independent claims.

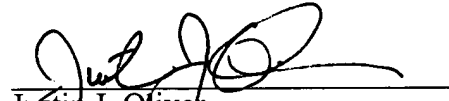
The remaining claims in the present application are dependent claims which depend from the independent claims, and thus are patentable over the documents of record for the reason noted above with respect to the independent claims. In addition, each recites features of the invention still further distinguishing it from the applied documents. Applicant requests favorable and independent consideration thereof.

For the foregoing reasons, Applicant submits that the claims are distinguishable over the applied documents, whether those documents are taken alone or in combination, and requests withdrawal of the rejection under 35 U.S.C. § 103.

Applicant also submits that this application is in condition for allowance, and respectfully requests a Notice of Allowance.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,


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